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SINGLE and MULTIBAND QUARTER WAVE RESONATOR

This application claims the benefit of priority pursuant to 35 USC §119(e)(1) from the provisional patent application filed pursuant to 35 USC §111(b): as Serial No. 60/157,945 on October 6, 2000.

now US Patent 6,239,765

T.H. This is a continuation-in-part of application Ser. No. 09/382,179 filed on August 24, 1999 the benefit of priority from which is hereby claimed pursuant to the provisions of 35 USC §120.

FIELD OF THE INVENTION

The present invention relates to an antenna assembly for a wireless communication device, such as a cellular telephone. Particularly, the present invention relates to compact antenna assemblies including a GPS-frequency quarter wave resonator and a single or multiple band quarter wave resonator of associated wireless communication devices.

BACKGROUND OF THE INVENTION

Known wireless communications devices such as hand-held cell phones and data modems (LANs) typically are equipped with an external wire antenna (whip), which may be fixed or telescoping. Such antennas are inconvenient and susceptible to damage or breakage. The overall size of the wire antenna is relatively large in order to provide optimum signal characteristics. Furthermore, a dedicated mounting means and location for the wire antenna are required to be fixed relatively early in the engineering process.

Several other antenna assemblies are known, including:

Quarter wave straight wire antenna

This is a 1/4 wavelength external antenna element, which operates as one side of a half-wave dipole. The other side of the dipole is provided by the ground traces of the transceiver's printed wiring board (PWB). The external 1/4 wave element may be installed permanently at the top of the transceiver housing or may be threaded into place. The 1/4 wave element may also be telescopically received into the transceiver housing to minimize size. The 1/4 wave straight wire adds from 3-6 inches to the overall length of an operating transceiver.